What Determines Corruption? International Evidence from Micro Data
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ABSTRACT

This paper utilizes a micro-level data set from 49 countries to address three issues: What determines corruption at the individual level? What determines the perception of the extent of corruption in the country? Does corruption have a direct impact on growth when the quality of the institutions are controlled for? In addition, the paper creates a direct measure of corruption which portrays the extent of corruption as revealed byindividuals who live in those countries.

The results show that both personal and country characteristics determine the risk of exposure to bribery. Examples are gender, wealth, education, marital status, the city size, the legal origin of the country, the existence of uninterrupted democracy, a war between 1960s and 1980s, and the strength of the institutions in the country (measured by the risk of expropriation).

The second part of the paper shows that controlling for endogeneity of corruption and institutional quality, actual corruption in the country and the proportion of the bribes asked by various government agencies have no direct impact on corruption perception. On the other hand, an improvement in the quality of institutions lowers the perception of corruption.

The final section of the paper shows that controlling for the quality of the institutions, corruption does not have a direct impact on growth. Keeping constant the geographical location of the country, the legal origin, religious composition, the presence of a war, the federal status, initial education and income as well as the extent of corruption in the country, a one-half standard deviation increase in the quality of institutions (e.g. from the level of Indonesia to the level of India), generates an additional 0.7 percentage point increase in the average annual per capita GDP growth.

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WHAT DETERMINES CORRUPTION?
INTERNATIONAL EVIDENCE FROM MICRO DATA

I. Introduction

Because an increase in *perceived* corruption in a country is thought to be associated with a slower rate of economic growth (Mauro 1995), a sizable literature has emerged recently to examine factors that impact the level of corruption across countries. For example, Ades and Di Tella (1999) found that corruption is higher in countries where domestic firms are sheltered from foreign competition. Graeff and Mehlkop (2003) documented the relationship between a country's economic freedom and its level of corruption. Brunetti and Weder (2003) found that a higher freedom of the press is associated with less corruption. Van Rijckeghem and Weder (2001) showed that the higher the ratio of government wages to manufacturing wages, the lower is corruption in a country.[1]

The current research on corruption has two common characteristics. First, it exclusively relies on *subjective* measures of corruption. Specifically, it employs various indexes of *corruption perception*, based on the surveys of international business people, expatriates, risk analysts, and local residents. The use of a corruption perception index is justified because the actual level of corruption in a country is difficult to observe. Certain potential measures of corruption, such as the number of prosecuted corruption-related cases in a country, may be rather noisy measures. For example, a low arrest rate for bribery may indicate a low prevalence of corruption or it may indicate wide-spread corruption with no prevention efforts.

Second, because corruption data are available only at the aggregate (country) level, existing research has focused on explaining the cross-country variation in corruption. Two

[1] Research on the consequences of corruption is more limited. An example is Alesina and Weder (2002),

exceptions are Swamy et al. (2001) and Svensson (2003). Swamy et al. (2001) used micro data where respondents answered questions on *hypothetical* situations regarding corruption. In the same paper, they analyzed the responses of 350 managers from the former Soviet Republic of Georgia to a question on the frequency of an official requesting unofficial payments. Svensson (2003) analyzed the bribery behavior of 176 firms in Uganda.

This paper analyzes information obtained from over 90,000 individuals from 49 countries pertaining to their direct experiences with corruption. Specifically, the individuals are asked whether any government official such as a government worker, police officer, or inspector in that country has asked them or expected them to pay a bribe for his services during the previous year. Using these micro data the paper looks at four issues. First, it investigates the determinants of the probability of being asked for a bribe. Following the theoretical arguments put forth by Treisman (2002), this probability is explained by a number of country characteristics. In addition, personal characteristics of the individuals are controlled for as they are expected to impact the exposure to corruption through the mechanisms discussed in Section II below. The results show that the characteristics of an individual influence his/her propensity of exposure to bribery. For example, males, individuals with higher income and education are more likely to be asked for a bribe. Country characteristics also influence exposure to bribery. For example, an increase in the quality of the institutions in the country and the existence of uninterrupted democracy are associated with reduced corruption propensity.

Second, using these micro data, an aggregate (country level) corruption index is created, which is the weighted proportion of individuals who were asked for a bribe in the country. This index is a direct indicator of the breadth of corruption. Put differently, it measures how wide-spread corruption is in the country. This measure of corruption is compared to four widely-used

corruption perception indices generated by Transparency International, World Bank, Business International and International Country Risk Guide.

Third, exploiting the detail of the micro data, the proportion of bribes asked for by various players, such as government officials, police officers, customs' officers, inspectors and other officials is calculated. The relationship between corruption perception indexes and these various sources of corruption is analyzed, which demonstrates that the extent of corruption in government offices and the police have significant impacts on perceived corruption about the country. However, when the quality of the institutions (measured by the risk of expropriation) in the country is controlled for, the association between actual corruption in the country and the corruption perception about the country disappears. Instead, the quality of institutions are significant determinants of corruption perception about the country.

Finally, the paper shows that for the countries in this data set, per capita income growth between 1975 and 1995 is influenced by the quality of the institutions of the country; but keeping constant the quality of the institutions, the extent of corruption does not exert a statistically significant impact on economic growth. This result is in contrast to earlier studies which suggested the existence of a direct negative impact of corruption on economic development.

II. What Determines Corruption? Theoretical Considerations

Macro-level

Treisman (2000) details a number of hypotheses that link the level of corruption in the country to its legal, political and socio-economic characteristics. Following his discussion and the literature he cites, it is postulated that at the macro level the following holds:

(1) $COR_j = f_1(L_j, C_j, Econ_j)$,

where the extent of corruption in country j (COR_j) depends on Legal (L) and Cultural (C) attributes of the country, as well as the level of economic development of the country (Econ). Economic development, on the other hand, is argued to be negatively impacted by the extent of corruption in the country (Mauro 1995). To incorporate this connection, consider Equation (2) where corruption is postulated to have a direct impact on economic development.

(2) $Econ_j=f_2(COR_j, K_j, C_j, H_j, L_j)$.

Acemoglu, Johnson and Robinson (2001) demonstrate that the quality of institutions in the country, such as secure property rights, has a direct impact on development. Thus, in Equation (2) K represents the institutional characteristics of the country. H stands for standard human capital measures that impact economic development, such as the level of education in the country.

Substituting Equation (2) into (1) generates the macro-level reduced form

(3) $COR_j=f_3(L_j, C_j, H_j, K_j)$.

Micro-level

At the micro level a number of formulations can be developed to demonstrate the determinants of corruption. Examples are Kaufmann and Wei (1999), Ades and Di Tella (1999), Van Rijckeghem and Weder (2001). Similarly, one can consider that the utility of the bribe-receiving government official depends on composite consumption good, the number of bribes he receives, and the quality of the institutions in the country. Consumption is determined by the sum of earned legal income and illegal income (the unit price of each bribe multiplied by quantity of bribes). An increase in the income of the target victim increases the unit price of each bribe, and an increase in the quality of institutions in the country lowers it, perhaps by increasing the

probability of apprehension. In this framework, it is easy to show that an increase in the income of the potential victim would increase the propensity to ask for a bribe. Alternatively, an increase in the quality of the institutions in the country, which would increase probability of apprehension, would in turn reduce the propensity to ask for a bribe.

Within this framework I estimate

(4) $COR_{ij}=f(X_{ij}, L_j, C_j, H_j, K_j)$,

where COR_{ij} is the propensity of the i^{th} individual who lives in country j to be a victim of corruption, X_{ij} represents personal characteristics of the individual, and L_j, C_j, K_j, and H_j are the characteristics of the country as described above. The theoretical and empirical research have identified viable candidates of X, L, C, H and K, which are described below.

Individual-specific Explanatory Variables

The propensity for being targeted for a bribe is assumed to depend on the following individual characteristics. *Age, marital status, labor market activity, wealth, education, gender* and *the location of the residence*. Because the dependent variable is essentially a measure of "exposure to bribery," individuals in certain age, wealth and labor market categories may be at a higher risk of being asked for a bribe. For example, all else the same, highly-educated and wealthy individuals should have higher exposure to being asked for a bribe by a government official because of their higher earning capacity. The opposite should be true for people who are not active in the labor market, such as the very young and old, as they may have less contact with government officials in comparison to prime-age individuals. Males are expected to be more frequent targets of bribery for a number of reasons. First, in most countries males are more active than females in the labor market for various reasons, and therefore they have more

exposure to government officials. Second, all else the same, males have a higher propensity to engage in criminal activity or to have tolerance for illegal activity (Mocan and Rees 1999, Swamy et al. 2001).

In larger cities the extent of bribery may be higher both because economic activity may be larger and more varied in scope which may increase the contact with the government, and also the relationship between individuals and government officials may be less personal in larger cities in comparison to smaller ones, which may make it easier to ask for a bribe.

Legal, Political and Cultural Country Characteristics

Following La Porta et al. (1998) and Treisman (2000), I include variables that measure the structure of the existing legal system in the country. More specifically, La Porta et al. (1998) argue that the common law system developed in England in the 17th century has been shaped by the parliament and aristocracy at the expense of the crown and it is intended to limit the power of the sovereign. As a consequence, British common law puts emphasis on individuals' private and property rights, and it intends to limit, rather than strengthen, the power of the state (David and Brierley 1978, Finer 1997, La Porta et al., 1998). In comparison, French civil law, Scandinavian civil law and German civil law are designed as instruments of the state to expand its power; and socialist law is a manifestation of the state's intent to create institutions to maintain power and extract resources without much regard for protecting economic interests (La Porta et al. 1998). Thus, individuals in countries with British legal origin are expected to face a lower propensity of corruption.

As discussed in Acemoğlu, Johnson and Robinson (2001), an argument dating back to Max Weber points to religion as a determinant of economic performance. Treisman (2000)

argues that religion may have a direct impact on corruption through two avenues. First, religion is a major part of culture, and in countries with hierarchical religions such as Catholicism, Eastern Orthodoxy and Islam, it may be culturally more difficult to challenge the authority of office-holders in comparison to cultures with more individualistic or egalitarian religions such as Protestantism. Second, as argued by Treisman (2000), in religions such as Protestantism, which emerged as a reaction to a state-sponsored religion, there may be stronger emphasis on monitoring potential abuses of state officials. By contrast, in more traditional religions such as Islam or Catholicism, such a check-and-balance role may be absent.

The impact of centralized versus de-centralized governmental structure on the level of corruption is unclear. There exist various theories that predict detrimental effects of both. For example, it is argued that the existence of a federal system leads to a more honest government because it promotes competition between various jurisdictions (Weingast 1995). Alternatively, it is hypothesized that a federal structure may lead to more corruption because in that system there are fewer centralized forces to enforce honesty, and the level of interaction between potential corrupters and government officials is greater at the local level (Tanzi 1995). To investigate this impact of the structure of the government, I control whether the country has a *federal system* of government.

Institutional and Political Characteristics

Higher quality institutions are expected to reduce the incidence of corruption. Along the same lines, interrupted *democracy* in the country and involvement in a *war* in recent history may have destabilizing effects, and therefore they may propagate the incidence of corruption.

A large government creates more occasions for individuals to interact with government workers, increasing the exposure to corruption. To control for the effect, I add a variable which is the *share of government* in per capita gross domestic product.

The quality of the institutions of the country can be measured in a number of ways such as the independence of the judicial system and the protection of civil liberties. Following Acemoğlu, Johnson and Robinson (2001), I use the *risk of expropriation* in the country (the risk of confiscation and forced nationalization of property) as a measure of the quality of the institutions. The structure of institutions is likely to change over the course of development; that is, the protection of property rights might get stronger as the country develops economically. Acemoglu Johnson and Robinson (2001) contol for the endogeneity of institutions by using the settler mortality rates in ex-colonies as instruments. As explained in section IV below, institutional quality and other potentially endogenous variables are instrumented by geographic indicators as employed by McArthur and Sachs (2001).

Other Country Characteristics

Ades and Di Tella (1999) indicate that countries with large endowments of raw materials are more susceptible to corruption because such resources create opportunities for the officials to exploit the associated rents, and this behavior may have spillover effects to other segments of the society. Thus, I control for the richness of *oil, iron, gold and zinc reserves* in the country. The level of education in the country is an aggregate measure of the human capital, and it is expected to be negatively related to the incidence of corruption as a more educated population is expected to be less tolerant of corruption. The *population* of the country and the *percentage of young people* in the population, and *male unemployment rate* are additional country characteristics

included. If increased unemployment is due to a cyclical downturn, it may capture a temporary decrease in income of the target population and therefore may reduce the size of a bribe, as well as frequency with which it is asked for. On the other hand, if high unemployment is an indication of structurally high joblessness, and if this is correlated with low income for government workers, unemployment may be positively correlated with the incidence of corruption.

Swamy et al. (2001) and Dollar, Fisman and Gatti (2001) use country-level data and show that corruption is less severe in countries where women hold a larger share of parliamentary seats. It is hypothesized that an increase in the proportion of seats held by women in the parliament may have a detrimental impact on corruption through women's influence on executive and judicial branch appointments and through being anti-corruption role models. Thus, I also investigate the impact of a change in the percentage of seats occupied by women in the parliament on individuals' risk of corruption.

III. Corruption Data

The data are compiled from a number of sources. The corruption data and the corresponding characteristics of the individuals are obtained from the International Crime Victim Survey compiled by the United Nations Inter-regional Crime and Justice Research Institute (http://www.unicri.it/icvs). Table 1 presents the list of countries included in the analysis. The data are collected through face-to-face and telephone interviews. The corruption measure for each individual is the answer to the question: *"In some areas, there is a problem of corruption among government or public officials. During [the past year] has any government official, for*

instance a customs officer, police officer or inspector in your own country, asked you or expected you to pay a bribe for his services?"

Table 1 also displays the number of individuals surveyed in each country, the year of their bribery experience (which is the year before the survey is administered), and the gender-specific means of the dichotomous variable "corruption", which is coded as 1 if the respondent indicated that he/she was asked for a bribe by a government official. As can be seen from the table, females are asked for a bribe less frequently than males in almost every country.

The third column of Table 1 displays country averages, which are weighted means of the corruption question. Corruption is highest in Indonesia, where 31 percent of the citizens indicated that they were asked for a bribe. The extent of corruption, measured this way, is 29 percent in Argentina, 26 percent in Bolivia, 24 percent in Uganda, and 21 percent in India and Kyrgyz Republic. Western European countries have low corruption rates, generally less than 0.5 percent; and corruption is practically zero in Japan.

There exist four widely-used aggregate corruption perception indexes. They are the measures created by Transparency International (TI) (http://www.transparcency.org/surveys/index.html), by the World Bank Researchers (http://www.worldbank.org/wbi/governance/govdata2002/), by Business International (BI) (Mauro 1995), and by International Country Risk Guide (ICRG) (Fishman and Gatti 2002). The TI index ranges from 1 to 10, the WB index ranges from –2.5 to 2.5, the BI index ranges from 1 to 10, and the ICRG ranges from 1 to 6, where a higher value represents a lower degree of perceived corruption. Simple correlations between these corruption perception indexes are high, ranging from 0.71 to 0.96.

There are two dimensions of corruption: how widespread it is in the country (breadth) and the size of each bribe (depth). The depth of bribery is likely to vary between government agencies. The amount of bribe asked by a licensing office will be different from the amount of bribe asked by a custom's officer. It also depends on whether bribe involves theft (Schleifer and Vishny 1993). The four corruption indexes which are used in previous literature are measures of corruption perception. Therefore it is unclear whether they capture the beliefs about the depth or breath of corruption, or whether and they are mixtures of both. In contrast, the index used in this paper is a measure of the breath of corruption in the country.

Figures 1-5 display the corruption measure created from the data set used in this paper (Average Overall Corruption of Table 1) along with the four subjective corruption perception indexes, where the corruption perception indexes are reversed such that higher values represent higher levels of corruption. For each country, the data are merged with corruption perception indexes by year. For example, as can be seen in Table 1, France is surveyed twice, and individuals are asked about their corruption experiences for the years 1995 and 1999. The TI index is available for both of these years. Therefore, average corruption in France in 1995 (0.007) is matched with the corresponding value of the TI index in 1995, and average corruption in France in 1999 (0.0125) is matched with the value of the TI index for France in 1999. Thus, some countries contribute more than one observation in Figures 1-5.[2] The World Bank corruption index is created for the years 1996, 1998, 2000 and 2002 (Kaufmann, Krayy and Mastruzzi 2003). Therefore, the closest year of the World Bank index is matched with our data. For example, for countries where corruption activity pertains to 1995 in our data, the World

[2] These countries are the U.K., Netherlands, Finland, Sweden, France, United States, Canada and Poland.

Bank index of 1996 is used. The match is less accurate for the BI and ICRG perception indexes as these indexes cover the intervals 1980-83, and 1982-90, respectively (see Mauro 1995, and Fisman and Gatti 2002).

The curves in Figures 1-4 are the predicted values of regressions of perceived corruption indexes on the percentage of individuals who are asked for a bribe (displayed on the horizontal axes). In all cases a non-linear relationship is visible, which is especially pronounced in the case of TI and WB indexes. Regressions with quadratic terms of corruption provided better fits. For example, in the regression with TI perception index as the dependent variable (Figure 1), the adjusted-R^2 was 0.77, and it was 0.59 without the quadratic term. In case of the regressions involving the WB Corruption Perception index, the adjusted-R^2 was 0.62 in the linear case, and it was 0.80 in the quadratic case (Figure 2). This non-linearity is primarily due the fact that in a small number of countries, such as Argentina, Bolivia and Indonesia, citizens have reported high levels of corruption, but the external perception of corruption is relatively low in these cases. For example, Figure 1 shows that in Argentina 29 percent of the people indicate that they were asked for a bribe, while the perception of corruption based on the TI index does not fully reflect this phenomenon.

Figure 1 shows that a number of countries have very low levels of corruption, although their perceived corruption seems disproportionately higher than warranted. To be able to accommodate the patterns at the low- and high-end of the corruption spectrum, I fit a third-order polynomial of corruption. The predicted values from this regression are plotted in Figure 1 as the dotted curve, which are not much different from the ones provided by the quadratic regression.

In order to minimize the impact of outliers in a different way, robust regressions are estimated, which produced very similar coefficient estimates and predicted values to those obtained from quadratic OLS regression. The predicted values from robust regressions are displayed in Figures 1-4 as dashed lines.

Another way to address the nonlinearity is to run regressions on logarithmic scale. Figure 5 presents the data and the predicted values of the regression where the logarithm of the TI corruption perception index is regressed on the logarithm of actual corruption. The point estimate was 0.35 with a t-value of 10.6 (n=56, Adjusted R-square=0.67), suggesting that a 10 percent increase in the rate of bribery in the country increases the corruption perception of the country by 3.5 percent. In the model with the BI index, the elasticity of perceived corruption with respect to average corruption was 0.33 (t=5.25, Adjusted R-square=0.57). The elasticity was 0.64 in the model with the WB perception index (t=4.26, Adjusted R-square=0.23), and 0.25 in case of the ICRG index (t=5.03, Adjusted R-square=0.43).

Finally, multiple observations from some countries are dropped and regressions are re-estimated. That is, for the six countries that are surveyed both in 1995 and 1999 (see Table 1 and footnote 1), I dropped observations pertaining to 1999. In case of Poland, which is surveyed in 1991, 1995 and 1999, I dropped 1991 and 1999. Estimating the regressions without these eight observations did not change the pictures depicted in Figures 1-5.

IV. Empirical Results

Missing data pertaining to country-level variables (such as average education and institutional quality) are a problem for some counties, especially for those in Central and Eastern Europe. The countries with complete macro data are Indonesia, Philippines, Uganda, South

Africa, Zimbabwe, Botswana, Brazil, Argentina, Bolivia, Paraguay, Colombia United Kingdom, Netherlands, Switzerland, Belgium, France, Finland, Spain, Sweden, Austria, Portugal, Denmark, United States, Canada, Australia, Poland, Hungary, Japan, and India.[3] Table 2 displays the definitions and the descriptive statistics of the explanatory variables along with their sources. The descriptive statistics pertain to 54,209 individuals from the 29 countries mentioned above with no missing personal or country-level information. This is the data set used in micro-level empirical analyses in this section.

Columns I and II of Table 3 present the results of the estimated probit model, where the dependent variable is one if the respondent indicated that he/she was asked for a bribe in that year, and zero otherwise. The model includes time dummies to control for the impact of the year in which the survey is given. The regressions are weighted and the standard errors are adjusted to account for the fact that the unit of observation is the individual, but country-specific variables vary at the country and not at the individual level. Columns (I) and (II) report the estimated coefficients and their standard errors where all the right-hand-side variables are considered exogenous. Adding a dichotomous variable to distinguish between face-to-face and phone interviews did not have any impact on the results, and the variable itself was not significant.

The model contains an extensive number of variables to control for cultural characteristics of the country which may be correlated with both corruption propensity and women in the parliament, institutional quality and democracy. Examples are the religious make-

[3] In case of India, there was one missing variable, which was the male unemployment rate for the year 1995. Unemployment rate was not reported for India by the World Bank, World Development Report, which is the data source other countries' unemployment rate data. For not to lose the 1,193 observations from India, I used the 7.0 percent unemployment rate in 1995 for this country, reported by Planning Commission, Government of India, "9-th Five Year Plan" http://planningcommis sion.nic.in/plans/planrel/fiveyr/default.html

up of the country, the population size and structure, and the legal origin of the country. However, if democracy, expropriation risk, women in the parliament, and the share of the government in per capita GDP are correlated with some omitted cultural factors which also influence corruption, the estimates may be biased. Therefore, I also estimate the model with instrumental variable probit, where democracy, expropriation risk, the percentage of women in the parliament, and government's share of GDP are considered as endogenous variables, which are instrumented by the life expectancy in the country, the extent of enthnolinguistic fragmentation of the country, and geographical attributes of the country, measured by the absolute latitude of the country, average temperature and whether the country is landlocked. The descriptive statistics of these variables are reported in Table 2.

The geographical characteristics of the country are exogenous, and McArthur and Sachs (2001) argue that they are appropriate instruments for institutions and other determinants of economic growth. Life expectancy at birth and the degree of ethnolinguistic fragmentation of the country change only slowly over time. These variables may capture aspects of the culture which may be correlated with institutions, democracy and women's involvement in politics, but they themselves are not expected to be influenced by corruption. The results of the instrumental variable probit are reported in columns (III) and (IV) of Table 3. The point estimates are very similar between columns (I) and (III), but for the most part the coefficients are estimated with more precision when democracy, low expropriation risk, women in parliament and share of government are considered endogenous.

The Impact of Personal Characteristics

The results, reported in Table 3, show that individuals who live in smaller cities face a lower propensity of being asked for a bribe. Males are more likely to be asked for a bribe. Wealthier individuals (those who are in the top 50 percent of the income distribution in the country) are more likely to engage in corruption. Similarly, individuals who are more educated are more likely to be targeted for bribes. These results are consistent with theoretical predictions discussed earlier in the paper, which indicate that more educated people who have higher incomes may have more contact with the government, which exposes them to a higher risk of being asked for a bribe.

Individuals who are 20-to-39 years of age are more likely to be asked for a bribe in comparison to those who are younger than 20. Individuals who are 60 years and older are less likely to get involved in corruption. Single individuals are less likely to be asked for a bribe in comparison to married individuals. These results may suggest that older (possibly retired) individuals and those who are single may have to deal with government rules and regulations less frequently.

Country Characteristics and Institutions

Instrumental variable probit results show that the legal origin of the country has an impact on corruption propensity. In countries with French legal origin the corruption propensity is about 1.4 percentage points higher in comparison to countries with Scandinavian or Socialist legal origins. German legal origin of the country increases the risk of corruption by14 percentage points. Following Acemoğlu, Johnson and Robinson (2001), the quality of the institutions is measured by the risk of expropriation. Table 3 shows that in countries where the

risk of expropriation is lower (where the variable *Low Expropriation Risk* takes higher values) the propensity to be asked for a bribe is lower. An improvement of expropriation risk by one standard deviation generates about a one-percentage point decrease in the propensity to be asked for a bribe. Given that the sample mean of corruption is 4.1 percent, this translates into a 24 percent decline, which is substantial.

If the country had uninterrupted democracy between 1950 and 1995, the risk of being a victim of bribery is about 1 percentage point lower. A federal government structure is also associated with about 1 percentage point reduction in corruption propensity. Having experienced a war in1960s to 1980s increases the risk of corruption by one percentage point.

Individuals who live in more populous countries face a higher propensity of corruption. More specifically, an increase in the country's population by one million is associated with an increase in the propensity to be asked for a bribe by 0.01 percentage points. A one percentage point increase in the unemployment rate in the country increases the risk of corruption by 0.1 percentage points. Average education in the country and the percentage of women in parliament have negative impacts on corruption risk, but they are statistically insignificant.

V. Is Perceived Corruption Related to the Source of Corruption?

Aggregate corruption perception indicators used by previous research by and large capture the sentiments of businesspeople and international organizations. Thus, they can be considered measures of risk assessment for the relevant countries. In this section I investigate whether the perceived extent of corruption is related to particular types of corruption incidence in the country. More importantly, I also analyze whether the quality of institutions has a direct influence on the corruption perception about the country, controlling for the source of corruption.

This is important for two reasons. First, this analysis will help us understand how perceptions of corruption are formed. Second, if perceived corruption about a country hurts that country's economic development, it would be important to shed light into the question of how to alter the perceived corruption about the country.

In the survey used in this paper, there is a follow-up question that was asked to those who indicated that they were asked for a bribe, which is posed as *"[The last time somebody asked for a bribe], what type of official was involved?"* In some years of the survey, the alternatives were government official, customs officer, police officer, inspector, and other. In some other years the alternatives were government official, customs officer, police officer, inspector, elected municipal councilors, municipal officials, tax/revenues officials, doctors/nurses, teachers/professors, officials in courts, private sector, and other. This allows a classification of the extent of bribery by type of recipient such as a government official, police officer, customs officer, inspector, and other recipients. For each country, the weighted percentage of bribes asked by each category is calculated.

Table 4A displays regression results where the reversed-TI index is regressed on region dummies (Central Europe, Mediterranean, etc.), legal origin dummies and variables that measure the religious composition of the country. In these regressions the unit of observation is the country, and the regressions are based on 43 observations. Standard errors are adjusted for clustering at the region level, and the models are estimated with instrumental variables, where linear and quadratic measures of corruption indicators and expropriation index are instrumented by average temperature of the country, absolute latitude of the country, whether the country is landlocked, and the extent of ethnolinguistic fragmentation. The results displayed in Panel A are from the regression where the rate of overall bribery (average corruption) is the indicator of

corruption incidence. Column (I) of Table 4A demonstrates that an increase in average corruption in the country generates an increase in perceived corruption about that country measured by the TI index. A non-linear relationship was evident in a regression with no control variables (which created Figure 1). Column (II) adds the quadratic corruption term to the regression, but the existence of the control variables eliminates the statistical significance of the quadratic term of corruption. On the other hand, the hypothesis that linear and quadratic terms are jointly significant is rejected at the 1.6 percent level. The F-tests pertaining to this hypothesis are reported for each regression.

When Low Expropriation Risk is added to the model (column III) a different picture emerges. Neither the expropriation nor the corruption variables are individually significant, and the hypothesis that corruption variables are jointly zero cannot be rejected. When the specification omits the quadratic corruption term, but keeps the Low Expropriation Risk (column IV) the coefficient of the linear corruption term remains insignificant. Low Expropriation Risk becomes borderline significant in this specification ($p=0.15$), and it is significant in column (V) where corruption variables are omitted.

Panel B presents the results of the model where average corruption is replaced by government corruption. This variable is the weighted average of the proportion of the individuals who indicated that the bribe was asked by a government or public official. Similarly, Panel C presents the results from the model where TI corruption perception index is regressed on the incidence of Police Corruption in the country, where Police Corruption is the weighted percentage of the individuals who were asked for a bribe by a police officer, given that a bribe was requested. The country averages of these corruption measures are listed at the bottom of each panel. For example, in the 43 countries used in these regressions, 30.08 percent

of the time it was a government official who asked for a bribe, and 31.73 percent of the time the perpetrator was a police officer.

Columns (I) and (II) of Panels B and C indicate that increases in the extent of corruption in government offices and within the police generate increases in the corruption perception of the country as measured by the (reversed) TI index. However, when the measure of institutional quality is added to the model, the significance of corruption variable disappears. Instead, institutional quality (Low Expropriation Risk) becomes a significant determinant of corruption perception. The same result is obtained in panels D, E and F where the TI corruption perception index is explained by Customs Corruption, Inspector Corruption, and corruption among others, respectively.

The median estimate of the coefficient of Low Expropriation Risk within the panels of Table 4A is about -1.7. This means that, a 10 percent decline in the risk of expropriation in the country generates an improvement in the corruption perception of the country by 1.42 on the TI scale, which is 56 % of a standard deviation.

Table 4B presents the results of the same regressions as in Table 4A, with one difference: the dependent variable is the reversed-World Bank corruption measure. The same pattern is observed. That is, the quality of the institutions of the country, as measured by the risk of expropriation, influences the corruption perception about the country; but holding constant the quality of institutions, the extent of actual corruption has no direct impact on corruption perception. The WB scale is narrower than the TI index, ranging from 0 to 3.38. The median estimate of the impact of institutions within each panel is about -0.5, which means that a 10 percent decline in the risk of expropriation in the country generates an improvement in the

corruption perception of the country by 0.42 on the WB scale, which is 40 % of a standard deviation of the WB index.

Same regressions were run for the BI and the ICRG indexes. These indexes were not related to either bribery incidence in the country, or it components, or the quality of institutions.

Given that the incidence of corruption is low in North America, Western Europe, Australia and Japan, the corruption rates among government officials, police, inspectors and other officials are calculated on small samples, and are therefore noisy. Measurement error in these variables may be the cause for the lack of a statistically significant relationship between corruption perception indexes and sources of corruption. To minimize measurement error in the sources of corruption, the regressions are estimated by excluding Western European and Mediterranean countries, the U.S., Canada, Australia and Japan. In case of the BI index, regressions could not be run because most central European countries do not have an assigned value for the BI index. In case of the TI and WB indexes the results were very similar to those displayed in Tables 4A and 4B. Furthermore, although the sample sizes were smaller (21 countries), higher statistical significance is obtained, and in regressions that use the ICRG index, the expropriation risk was highly significant.

These results show that the perception of corruption formed about a country is influenced by the quality level of the institutions of that country. Once the level of institutional quality is controlled for, the extent of actual corruption in the country or the extent of corruption in various government offices (police, customs, etc.) do not have a direct impact on corruption perception. This suggests that the efforts to curb corruption can be focused on reforming the institutions of the country to impact the corruption perception about the country.

VI. Growth and Corruption

In this section I re-visit the corruption-growth relationship documented by Mauro (1995). In light of the results of the previous sections, it is important to investigate whether previously documented relationship between corruption and growth is a causal one. Given that institutional quality impacts corruption as well as the perception of corruption about a country, and given the evidence that institutions impact growth (Acemoğlu, Johnson and Robinson 2001), it is conceivable that corruption-growth relationship is a correlation which emerges in models that do not control for institutions. This is an important issue with significant policy implications. If corruption has a direct causal impact on growth, efforts can be channeled on corruption control and deterrence. On the other hand, if institutions have an impact on growth, then efforts should be focused on institutional reforms.

For each country in the data set the average annual growth in per capita GDP between 1975 and the year of the survey (typically 1995) is calculated. For the countries where the survey is conducted in multiple years, the year closest to 1995 is chosen. For many Eastern European countries GDP data are not available in 1975; thus such counties cannot be included in this analysis. The average value of annual income growth in the sample of countries is 1.7 percent. The highest average annual growth during this two-decade period is in Botswana with 4.8 percent, and the two negative average annual growth rates are in South Africa and Bolivia, with –0.2 percent and –0.055 percent, respectively.

In addition to geographic location indicators, legal origin measures and religious composition variables, the growth regressions include dichotomous variables to indicate the presence of a war and federal structure of the country. Also included are average education in

the country in 1975 as a measure of human capital at the beginning of the period where growth is analyzed, and real per capita GDP in 1975 (Initial GDP).[4] In order to investigate the direct impact of corruption on growth net of the impact of the quality of institutions, the regressions also include expropriation risk as a regressor.[5] Regressions are estimated with instrumental variables where the corruption and expropriation risk are instrumented by the absolute latitude of the country, average temperature in the country, an indicator variable which takes the value of one if the country is landlocked, and the extent of the ethnolinguistic fragmentation of the country.

Table 5 displays the result from five different regressions. In column (I), linear and quadratic corruption measures are included along with Low Expropriation Risk. The coefficients have predicted signs, where increased corruption has a detrimental effect on growth, and Low Expropriation Risk increases growth. However, neither variable is statistically significant, although all three are jointly significant with an F-value of 11.35 (p=0.007). The hypothesis that corruption variables are jointly zero cannot be rejected (F=0.65, p=0.55). Column (II) presents the results where economic growth is explained by linear and quadratic corruption variables, but the expropriation risk is omitted from this specification. In this case, corruption variables are jointly significant (F=22.2, p=0.002). Column (III) contains the results from the model where only the linear corruption term is included, which shows that the estimated impact of corruption is not statistically significant. In Column (IV) we see that reduced risk of expropriation has a positive and statistically significant impact on growth when it is included to the model with no

[4] Education in 1975 was obtained from Barro and Lee (1996), and per capita income in 1975 was obtained from Penn World Tables, version 6.1. The results did not change when I used average education in 1970, 1965 or 1960; or primary, secondary and high school completion rates in 1975, 1970, 1965 or 1960.

[5] Thus, these regressions are based on Equation (2).

corruption measures. Column (V) demonstrates that the corruption measure has no statistically significant impact on growth when included along with low expropriation risk. In this specification the expropriation risk variable is not statistically significant at conventional levels with a p-value of 0.13.

The regressions in Table 5 are based on 30 observations, which imply 10-12 degrees of freedom. To increase the precision of the estimates, regressions with various alternative specifications are estimated which are reported in Table 6. Column (I) of Table 6 omits the region dummies. In column (II) both region indicators and legal origin dummies are dropped. Column (III) presents the results from a regression which does not include region, legal origin, war or federal government indicators. Finally, column (IV) displays the results from a regression where only legal origin indicators are omitted. In all cases the coefficient of corruption is insignificant and the point estimate is close to zero. The expropriation risk, on the other hand, remains statistically significant with almost no change in the point estimate.

Table 7 performs the same exercise excluding developed economies. More specifically, columns (I) to (III) display the results of regressions that use data from 19 countries in Central Europe, Latin America, Asia, Africa and the Mediterranean. Columns (IV) to (VI) reports the results based on the sample which excludes the Mediterranean countries and Japan in addition to North America, Australia and Western Europe. Although the sample size gets smaller in these regressions, the coefficient of Low Expropriation Risk remains statistically significant, and the point estimate is around 0.009, which is similar to the one observed in Tables 5 and 6. The coefficient of corruption, on the other hand, is never significant. Using the four corruption perception indexes (TI, WB, BI and ICRG), instead of the corruption index employed in this

paper, did not change the results. These indexes were not significant determinants of growth even in the models which did not contain expropriation risk.

In summary, the results displayed in Table 7 indicate that when included jointly with the expropriation risk, corruption does not have a direct impact on economic growth. This suggests that the effect of corruption on growth is because of the impact of institutions on corruption. Put differently, weak institutions cause corruption and weak institutions impede economic growth, but once the quality of institutions are controlled for, there is no direct impact of corruption on growth.

The point estimates in Tables 5-7 imply that a 1/2-standard deviation improvement in the quality of institutions (0.81 units) generates an increase in the average annual per capita GDP growth rate by about 0.7 percentage points. Another way to put this magnitude in perspective would be to consider two otherwise similar countries with per capita incomes of $2,500 in 1975. Assume that the first country's level of institutional quality is one-half standard deviation below that of the second country (which is akin to the case of Indonesia and India). Real per capita income of the first country is expected to rise to $3,500 by 1995, while per capita income in the country with one-percentage point less corruption would be about $4,000.

VII. Conclusion

This paper utilizes a micro-level data set from 49 countries to address three issues: What determines corruption at the individual level? What determines the perception of the extent of corruption in the country? Does corruption have a direct impact on growth when the quality of the institutions are controlled for?

The paper portrays the extent of corruption as revealed by citizens who live in those countries. Exposure to corruption is defined as having been asked for a bribe by a government official, such as a government worker, customs officer, police officer, or inspector in that country. The country-level corruption indicator created in this paper is the proportion of individuals in a country who were asked for a bribe in a year. This is the first direct measure of corruption created in this literature, which gauges how wide-spread corruption is in the country. This measure is shown to be highly correlated with widely-used corruption *perception* indexes such as the ones generated by Transparency International (TI), World Bank (WB), Business International (BI), and International Country Risk Guide (ICRG). However, some countries, such as Argentina and Indonesia seem to be outliers where the extent of bribery reported in these data is more severe than the perceived corruption in those countries.

The analysis of the determinants of corruption is done using 54,209 individuals from 29 countries who had no missing data on personal and country attributes. The regressions control for the endogeneity of institutions, democracy, the proportion of women in the parliament, and the government's share of per capita GDP. The results show that both personal and country characteristics determine the likelihood of being asked for a bribe. Males, wealthier and more educated individuals are more likely to be asked for a bribe. The same is true for individuals living in larger cities, and those who are not single.

If the legal origin of the country is French or German, this is associated with a higher risk of being asked for a bribe in comparison to British, Scandinavian or Socialist legal origins. If the country had uninterrupted democracy between the years of 1960 and 1980, this reduces the risk of being asked for a bribe one percentage point. If a war occurred in the country during the 1960s to 1980s, the risk of corruption is one percentage point higher.

The strength of institutions in the country (as measured by low risk of expropriation) has the benefit of reducing the extent of corruption in the country. If the risk of expropriation in the country goes down by one standard deviation, this reduces the propensity of corruption by almost one percentage point.

The second part of the paper investigates how the perception of the extent of the corruption in the country is formed. Country-level regressions are run where TI, WB, BI and ICRG corruption perception indexes are regressed on a number of country characteristics, the extent of actual corruption in the country (and its components, such as police corruption, government corruption, etc.), as well as the institutional quality of the country. Controlling for endogeneity of corruption and institutional quality, it is shown that actual corruption in the country and the proportion of the bribes asked by various government agencies have no direct impact on corruption perception. On the other hand, an improvement in the quality of institutions lowers the perception of corruption. Specifically, a 10 percent decline in the risk of expropriation in the country generates an improvement in the corruption perception of the country by about 60% of a standard deviation of the TI corruption perception index, and by 40% standard deviation of the WB corruption perception index. These findings suggest that concentrating efforts on reforming the institutions of the country will be an effective method to influence the perceptions about the extent of corruption in the country.

Earlier research has argued that corruption is negatively correlated with development (Mauro 1995). Another line of research has demonstrated that weak institutions cause macroeconomic volatility and slower economic growth (Acemoğlu, Johnson, and Robinson 2001; Acemoğlu, Johnson, Robinson and Thaicharoen 2003). Given the results in this paper which show that institutions influence corruption, it is important to re-investigate the link

between corruption and growth in a model that accounts for the quality of institutions of the country. This analysis in the final section of the paper shows that the strength of institutions in the country (as measured by low risk of expropriation) improves the rate of economic growth in the country. However, controlling for the quality of the institutions, corruption does not have a direct impact on growth. It cannot be ruled out that this result is specific to the time period analyzed (1975-1995) or to the countries in the data set. But it suggests that the documented association between corruption and growth is likely due to the omitted influence of institutions on corruption. Keeping constant the geographical location of the country, its legal origin, religious composition, the presence of a war, federal status, initial education and income as well as the extent of corruption in the country, a one-half standard deviation increase in the quality of institutions (e.g. from the level of Indonesia to the level of India), generates an additional 0.7 percentage point increase in the average annual per capita GDP growth. For a developing country with $2,500 per capita income in 1975 this translates into an additional $500 per capita income by 1995.

Figure 1
Transparency International Corruption Index
vs. Corruption in the Country

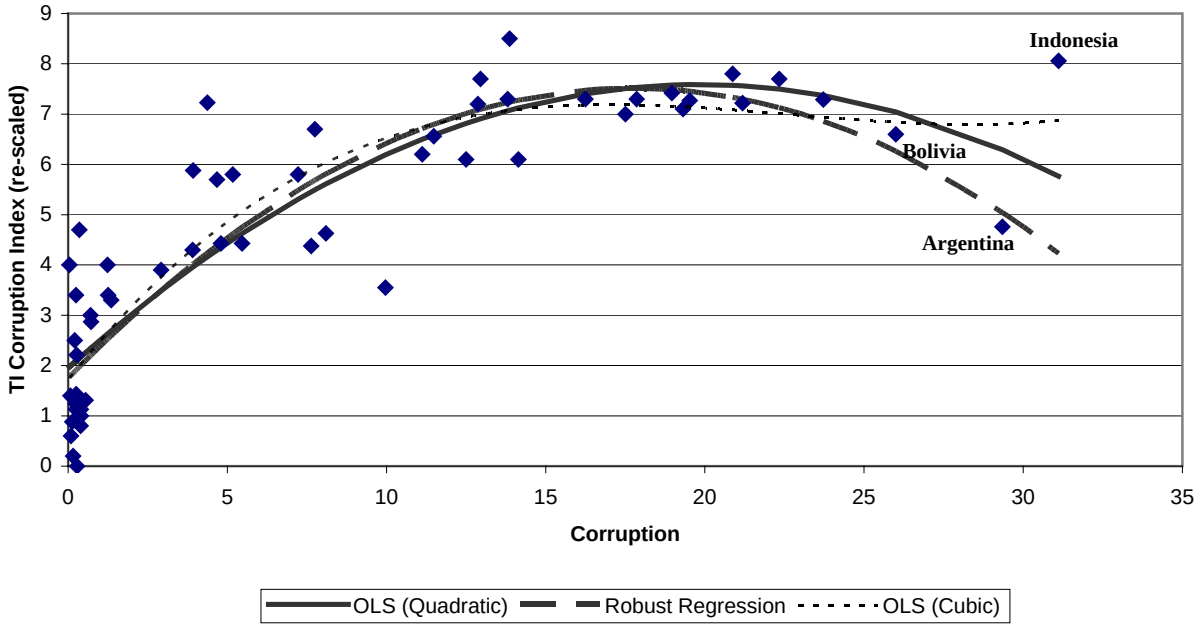

Figure 2
World Bank Corruption Index
vs. Corruption in the Country

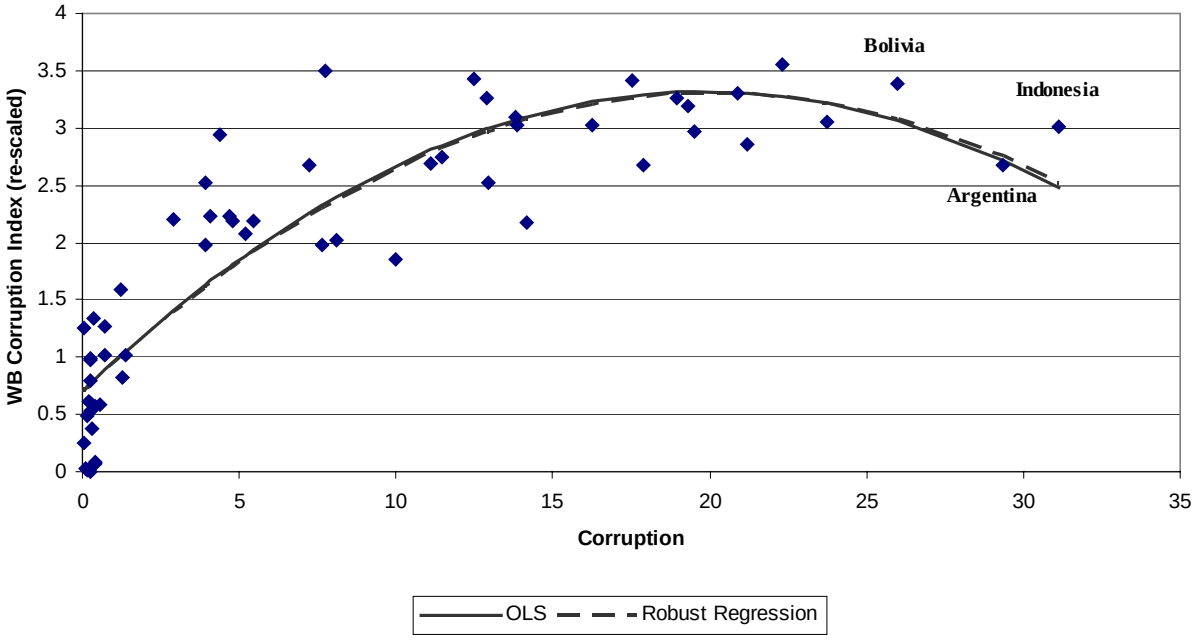

Figure 3
Business International Corruption Index
vs. Corruption in the Country

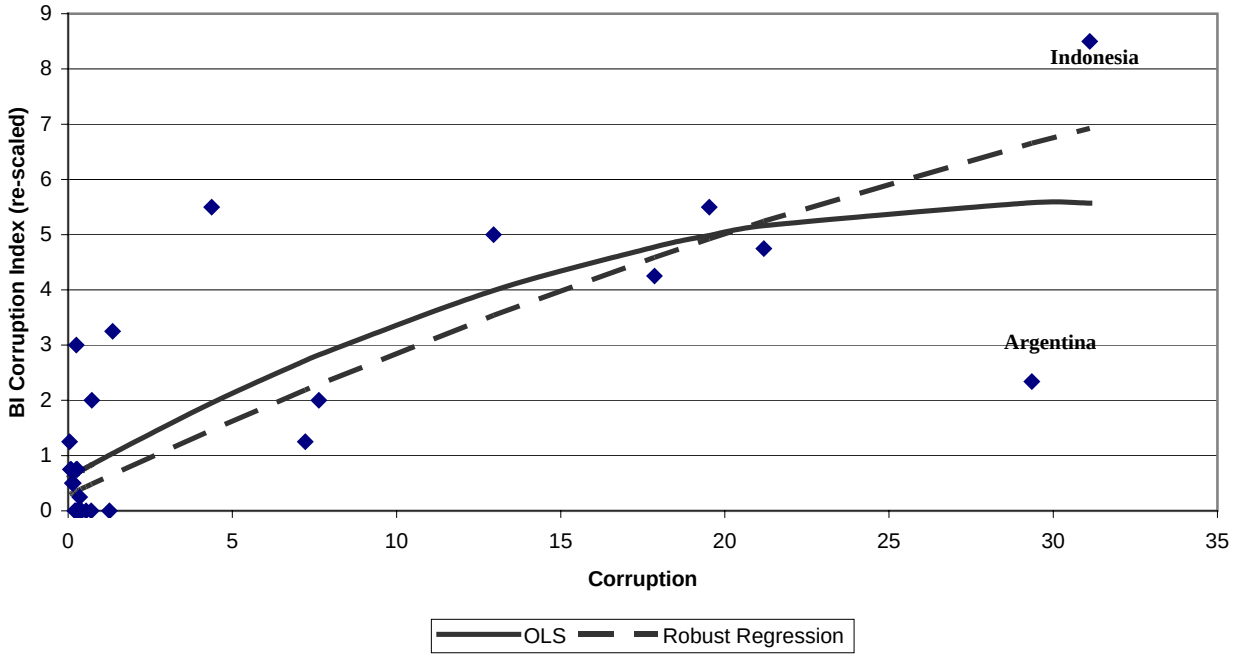

Figure 4
ICRG Corruption Index
vs. Corruption in the Country

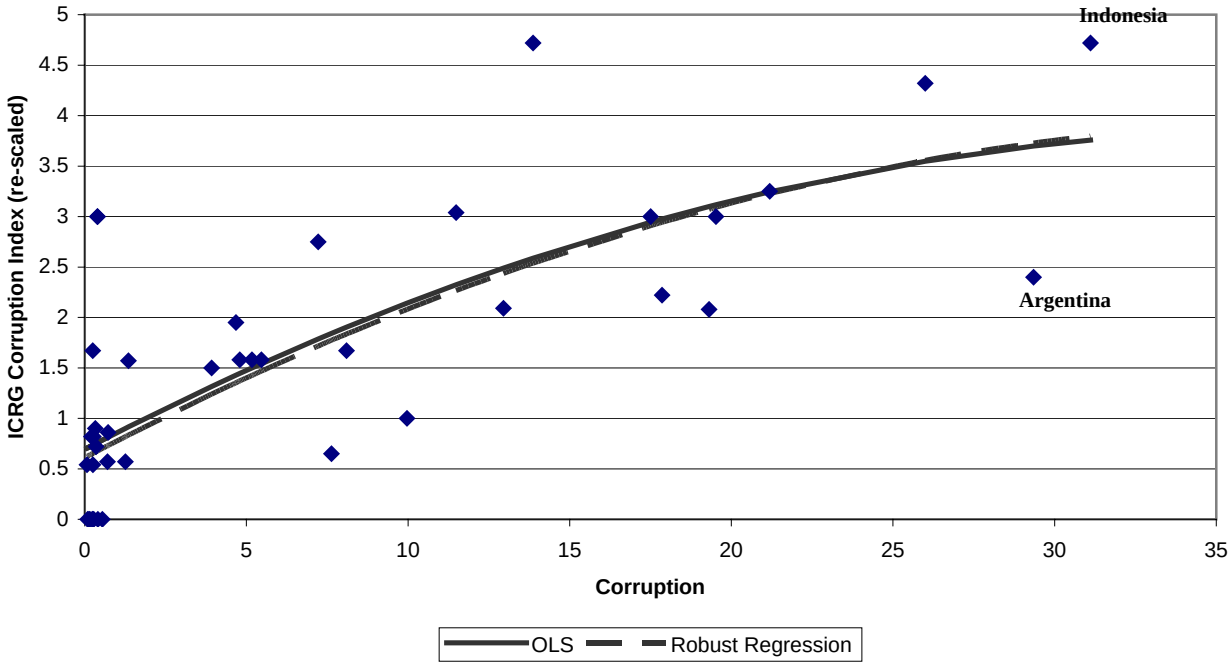

Figure 5
Log of Transparency International Corruption Index
vs. Log of Corruption in the Country

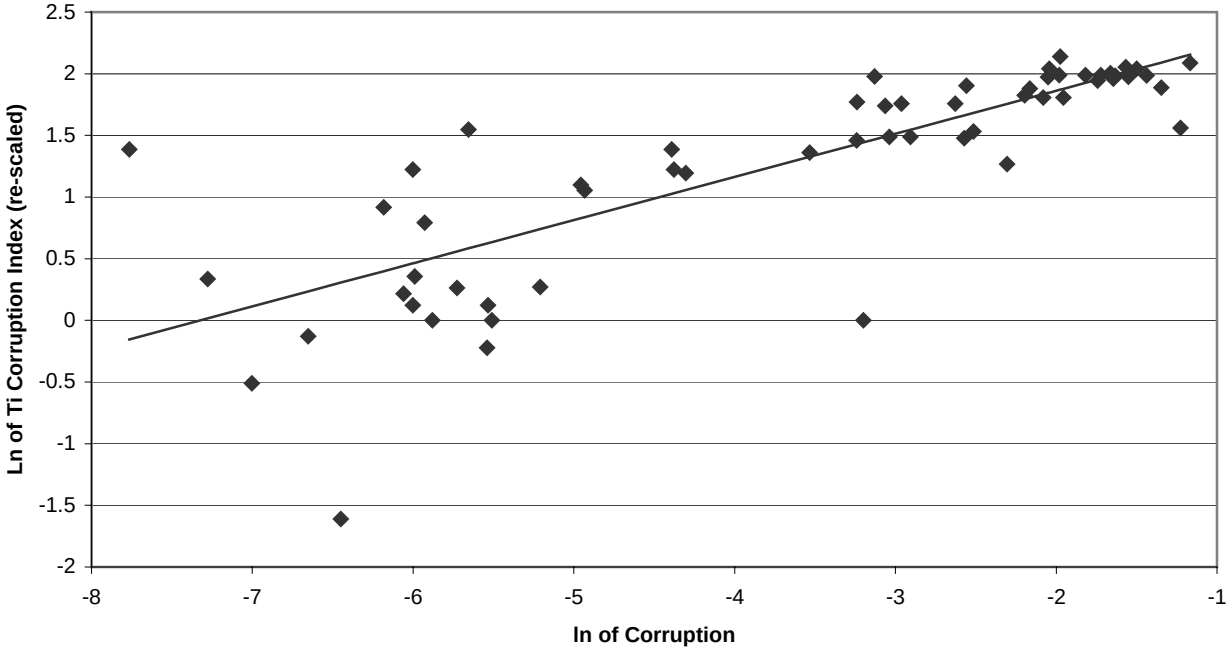

Table 1
The Incidence of Corruption by Country

Country Name	Year of Activity	Number of Observations	Average Corruption (Overall)	Average Corruption (Male)	Average Corruption (Female)
WESTERN EUROPEAN COUNTRIES					
United Kingdom	1995	5404	0.0025	0.0030	0.0021
United Kingdom	1999	5513	0.0007	0.0009	0.0005
Netherlands	1995	2007	0.0055	0.0082	0.0028
Netherlands	1999	1998	0.0040	0.0037	0.0044
Switzerland	1995	1000	0.0023	0.0040	0.0007
Belgium	1999	2499	0.0035	0.0049	0.0022
Finland	1995	3829	0.0013	0.0027	0.0000
Finland	1999	1780	0.0016	0.0033	0.0000
Sweden	1995	1000	0.0025	0.0020	0.0029
Sweden	1999	2001	0.0009	0.0000	0.0018
Austria	1995	1507	0.0072	0.0126	0.0022
Denmark	1999	3006	0.0028	0.0053	0.0004
MEDITERRANEAN COUNTRIES					
France	1995	1003	0.0070	0.0126	0.0017
France	1999	997	0.0125	0.0155	0.0097
Spain	1999	2908	0.0025	0.0015	0.0034
Malta	1996	993	0.0408	0.0467	0.0350
Portugal	1999	1998	0.0135	0.0182	0.0091
U.S., CANADA and AUSTRALIA					
United States	1995	1000	0.0027	0.0055	0.0000
United States	1999	999	0.0021	0.0044	0.0000
Canada	1995	2132	0.0039	0.0043	0.0036
Canada	1999	2075	0.0039	0.0070	0.0009
Australia	1999	2003	0.0033	0.0044	0.0021
CENTRAL AND EASTERN EUROPEAN COUNTRIES					
Estonia	1994	1153	0.0391	0.0513	0.0257
Poland	1991	1974	0.0546	0.0734	0.0374
Poland	1995	3438	0.0480	0.0664	0.0310
Poland	1999	5194	0.0517	0.0699	0.0350
Czech Republic	1995	1752	0.0809	0.1040	0.0587
Slovakia	1996	1091	0.1414	0.1929	0.0940
Russia	1995	1006	0.1896	0.2545	0.1308
Georgia	1995	1110	0.2234	0.2887	0.1717
Slovenia	1996	2046	0.0124	0.0149	0.0095
Latvia	1995	1380	0.1380	0.1837	0.1051
Romania	1995	1083	0.1148	0.1535	0.0789
Hungary	1995	746	0.0392	0.0527	0.0275
Yugoslavia	1995	1089	0.1750	0.2325	0.1198
Albania	1995	1188	0.1295	0.1378	0.1211
Macedonia	1995	698	0.0775	0.1011	0.0534

Table 1 (concluded)					
Croatia	1996	981	0.1625	0.2046	0.1266
Ukraine	1996	979	0.1287	0.1586	0.1038
Belarus	1996	960	0.1250	0.1623	0.0937
Bulgaria	1996	1066	0.1932	0.2393	0.1497
Lithuania	1996	1165	0.1112	0.1659	0.0647
ASIAN COUNTRIES					
Japan	1999	2198	0.0004	0.0000	0.0008
Indonesia	1995	1338	0.3111	0.3692	0.2526
Philippines	1995	1497	0.0437	0.0462	0.0415
India	1995	1193	0.2119	0.2563	0.1691
Mongolia	1995	1188	0.0467	0.0559	0.0376
Kyrgyz Republic	1995	1714	0.2087	0.2951	0.1419
AFRICAN COUNTRIES					
Uganda	1995	1191	0.2372	0.3043	0.1745
South Africa	1995	996	0.0763	0.1235	0.0303
Zimbabwe	1995	1003	0.0722	0.0969	0.0491
Botswana	1996	638	0.0292	0.0569	0.0052
LATIN AMERICAN COUNTRIES					
Costa Rica	1995	998	0.0997	0.1449	0.0554
Brazil	1995	1000	0.1786	0.2763	0.0785
Argentina	1995	996	0.2935	0.3492	0.2408
Bolivia	1995	994	0.2600	0.2989	0.2230
Paraguay	1995	585	0.1386	0.1636	0.1181
Colombia	1996	984	0.1953	0.2397	0.1518

Corruption rates are weighted means of individuals who indicated that they were asked for a bribe in that country.

Table 2
Descriptive Statistics

Variable Name	Definition (source)	Mean (Std. Dev)
Individual Characteristics		
Corruption	Dummy Variable (=1) if the respondent is asked for bribe, 0 otherwise (A)	0.041 (0.197)
Small City	Dummy Variable(=1) it the respondent is living in a town with a population of 50,000 less (A)	0.450 (0.498)
Middle Size City	Dummy Variable(=1) it the respondent is living in a town with a population of 50,000 to 1 million (A)	0.298 (0.458)
Male	Dummy Variable (=1) if the respondent is male, 0 otherwise (A)	0.465 (0.499)
Age16to19	Dummy Variable (=1) if the respondent is between ages 16 and 19, 0 otherwise (A)	0.027 (0.161)
Age20to24	Dummy Variable (=1) if the respondent is between ages 20 and 24, 0 otherwise (A)	0.070 (0.256)
Age25to29	Dummy Variable (=1) if the respondent is between ages 25 and 29, 0 otherwise (A)	0.100 (0.299)
Age30to34	Dummy Variable (=1) if the respondent is between ages 30 and 34, 0 otherwise (A)	0.111 (0.314)
Age35to39	Dummy Variable (=1) if the respondent is between ages 35 and 39, 0 otherwise (A)	0.119 (0.324)
Age40to44	Dummy Variable (=1) if the respondent is between ages 40 and 44, 0 otherwise (A)	0.105 (0.307)
Age45to49	Dummy Variable (=1) if the respondent is between ages 45 and 49, 0 otherwise (A)	0.093 (0.290)
Age50to54	Dummy Variable (=1) if the respondent is between ages 50 and 54, 0 otherwise (A)	0.085 (0.278)
Age55to59	Dummy Variable (=1) if the respondent is between ages 55 and 59, 0 otherwise (A)	0.071 (0.256)
Age60to64	Dummy Variable (=1) if the respondent is between ages 60 and 64, 0 otherwise (A)	0.059 (0.236)
Age65to69	Dummy Variable (=1) if the respondent is between ages 65 and 69, 0 otherwise (A)	0.056 (0.230)
Age70+	Dummy Variable (=1) if the respondent is older than 70, 0 otherwise (A)	0.105 (0.306)
Single	Dummy Variable (=1) if the respondent is single, 0 otherwise (A)	0.217 (0.412)
Married	Dummy Variable (=1) if the respondent is married, 0 otherwise (A)	0.574 (0.495)
Widowed	Dummy Variable (=1) if the respondent is widowed, 0 otherwise (A)	0.082 (0.274)
Living together	Dummy Variable (=1) if the respondent is living together as a couple (but not married, 0 otherwise (A)	0.061 (0.240)

(Table 2 continued)

Divorced	Dummy Variable (=1) if the respondent is divorced, 0 otherwise (A)	0.066 (0.248)
Working	Dummy Variable (=1) if the respondent is working, 0 otherwise (A)	0.565 (0.496)
Looking for job	Dummy Variable (=1) if the respondent is looking for job, 0 otherwise (A)	0.061 (0.240)
Home keeper	Dummy Variable (=1) if the respondent is house keeper, 0 otherwise (A)	0.106 (0.308)
Retired/disabled	Dummy Variable (=1) if the respondent is retired or disabled, 0 otherwise (A)	0.216 (0.411)
Student	Dummy Variable (=1) if the respondent is still at school, 0 otherwise (A)	0.033 (0.180)
Other	Dummy Variable (=1) if the respondent is in other occupational position, 0 otherwise (A)	0.018 (0.134)
Upper income	Dummy Variable (=1) if the family income is in the upper 50% of the country, 0 otherwise (A)	0.506 (0.500)
Education	Years of education of the respondent (A)	11.755 (3.764)
Country Characteristics		
Western Europe	Dummy Variable (=1) if the country is in Western Europe, 0 otherwise	0.425 (0.494)
Mediterranean	Dummy Variable (=1) if the country is in Mediterranean region, 0 otherwise	0.072 (0.258)
Central Europe	Dummy Variable (=1) if the country is in Central Europe, 0 otherwise	0.166 (0.372)
Africa	Dummy Variable (=1) if the country is in Africa, 0 otherwise	0.054 (0.227)
Asia	Dummy Variable (=1) if the country is in Asia, 0 otherwise	0.088 (0.283)
Latin America	Dummy Variable (=1) if the country is in Latin America, 0 otherwise	0.075 (0.263)
U.S., Canada, Australia	Dummy Variable (=1) if the country the U.S, Canada or Australia, 0 otherwise	0.119 (0.324)
British Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is English, 0 otherwise (E)	0.357 (0.479)
French Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is French, 0 otherwise (E)	0.275 (0.446)
Scandinavian Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is Scandinavian, 0 otherwise (E)	0.128 (0.334)
German Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is German, 0 otherwise (E)	0.073 (0.261)
Socialist Legal Origin	Dummy Variable (=1) if the legal origin of the respondent is Socialist, 0 otherwise (E)	0.166 (0.372)

(Table 2 Continued)

Percent Muslim	Percent of Muslims in the country (E)	3.454 (4.804)
Percent Catholic	Percent of Catholics in the country (E)	45.117 (35.613)
Percent Protestant	Percent of Protestants in the country (E)	22.471 (27.900)
Population	Population of the country in millions in the survey year (G)	62.038 (132.438)
Population less than 25	Percentage of population less than 25 years of age (K)	37.374 (9.975)
Oil	Oil reserve of the country in million barrels (B)	39.049 (55.024)
Iron	Iron reserves of the country as a percent of world reserves (B)	1.436 (3.349)
Gold	Gold reserves of the country as a percent of world reserves (B)	1.523 (6.507)
Zinc	Zinc reserves of the country as a percent of world reserves (B)	2.304 (4.422)
Democratic	Dummy Variable (=1) if the country was democratic in all 46 years between 1950 and 1995(D)	0.593 (0.491)
Federal	Dummy Variable (=1) if at least two levels of government rule the same land and people, each level has at least one area of action in which autonomous, there is some guarantee of the autonomy of each government, 0 otherwise (D)	0.273 (0.446)
War	Dummy Variable (=1) if a war occurred during 1960s to 1980s, 0 otherwise (C)	0.150 (0.357)
Women in parliament	Percentage of women in parliament of the corresponding country (F)	17.302 (10.044)
Low Expropriation Risk	Expropriation Risk in the Country (High values indicate low expropriation risk, or stronger institutions) (C)	8.847 (1.350)
Average education	Average education of adults in the country in the survey year (J)	8.911 (1.988)
Unemployment Rate	Unemployment rate among males in the country (F)	8.206 (3.576)
Landlocked	Dummy Variable (=1) if the country is landlocked (surrounded by land), 0 otherwise (B)	0.116 (0.320)
Latitude	Absolute latitude of the country (E)	0.496 (0.175)
Ethnoling. Fragmentation	Ethnolinguistic Fragmentation in the country (E)	0.194 0.222
Life Expectancy	Life Expectancy at Birth in the country in 1995 (C)	73.443 7.744
Temperature	Average temperature of the country in Celsius (B)	11.784 (5.881)

Table 2 (concluded)

Government Share	Government share of per capita DGP (G)	11.368 (6.257)
Year95	Dummy Variable (=1) if the survey in the country was done in 1995, 0 otherwise	0.462 (0.499)
Year96	Dummy Variable (=1) if the survey in the country was done in 1996, 0 otherwise	0.023 (0.151)
Year99	Dummy Variable (=1) if the survey in the country was done in 1999, 0 otherwise	0.515 (0.500)

The descriptive statistics pertain to 54,209 observations with non-missing values in all variables.

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B: "National Cultures of the World: A Statistical Reference" (1997), Parker, Philip M., Greenwood Press.
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J: World Bank, Education Statistics Database http://www1.worldbank.org/education/edstats/
K: United Nations Statistics Division, Common Database, Population by Sex, Age Group, Urban and Rural, Census Years, Series Number 14890: http://unstats.un.org/unsd/cdb
L: Barro, Robert and Lee, Jong-Wha, 1996 "International Measures of Schooling Years and Schooling Quality" Dataset (http://www.worldbank.org/research/growth/ddbarle2.htm).

Table 3
The Determinants of Corruption
at the Individual level

	Probit		Instrumental Variable Probit	
	Coefficient	Standard Error	Coefficient	Standard Error
Individual Characteristics	I	II	III	IV
Small City	-0.008***	(0.003)	-0.006***	(0.001)
Middle Size City	-0.004*	(0.002)	-0.002*	(0.001)
Male	0.007***	(0.001)	0.007***	(0.001)
Upper income	0.003***	(0.001)	0.003***	(0.001)
Education	0.001***	(0.0002)	0.001***	(0.0001)
Age20to24	0.004*	(0.003)	0.004**	(0.002)
Age25to29	0.003	(0.003)	0.004**	(0.002)
Age30to34	0.003	(0.004)	0.003*	(0.002)
Age35to39	0.002	(0.003)	0.003*	(0.002)
Age40to44	0.0004	(0.003)	0.001	(0.002)
Age45to49	0.002	(0.004)	0.002	(0.002)
Age50to54	0.001	(0.005)	0.001	(0.002)
Age55to59	-0.002	(0.003)	-0.001	(0.002)
Age60to64	-0.005***	(0.001)	-0.004**	(0.001)
Age65to69	-0.004	(0.003)	-0.003	(0.002)
Age70+	-0.006***	(0.002)	-0.006***	(0.001)
Single	-0.002*	(0.001)	-0.001*	(0.001)
Widowed	0.003	(0.003)	0.003*	(0.002)
Living together	0.001	(0.002)	0.001	(0.001)
Divorced	`-0.0003	(0.002)	0.0002	(0.001)
Working	0.002	(0.001)	0.001	(0.001)
Looking for job	0.0002	(0.002)	0.0005	(0.001)
Home keeper	0.00004	(0.002)	-0.0004	(0.001)
Retired/disabled	-0.002	(0.002)	-0.002	(0.002)
Other	0.005	(0.003)	0.004*	(0.003)
Country Characteristics				
Western Europe	-0.02***	(0.006)	0.002	(0.019)
Mediterranean	-0.011***	(0.001)	-0.006	(0.007)
Asia	-0.016***	(0.001)	-0.014**	(0.004)
Africa	-0.011***	(0.001)	-0.009	(0.003)
Latin America	-0.011***	(0.001)	-0.008	(0.006)
Central Europe	-0.012***	(0.002)	-0.001	(0.019)
British Legal Origin	-0.012***	(0.003)	-0.009	(0.007)
French Legal Origin	0.012***	(0.003)	0.014**	(0.009)
German Legal Origin	0.083***	(0.015)	0.137***	(0.078)
Low Expropriation Risk	-0.008***	(0.0005)	-0.006***	(0.001)
Democratic	-0.008***	(0.003)	-0.013*	(0.008)
War	0.004*	(0.003)	0.011**	(0.006)
Federal	-0.008***	(0.001)	-0.009**	(0.003)
Percent Muslim	0.0003***	(0.0001)	0.001**	(0.0003)

(Table 3 concluded)

Percent Catholic	-0.00004	(0.00005)	0.000002	(0.0002)
Percent Protestant	-0.000001	(0.0001)	0.0001	(0.0002)
Oil	0.0001***	(0.00001)	0.00001**	(0.00003)
Iron	0.0004	(0.0003)	0.001	(0.001)
Zink	-0.001*	(0.0003)	0.0002	(0.001)
Gold	-0.0004***	(0.0001)	-0.0004**	(0.0002)
Population	0.0001***	(0.00001)	0.0001***	(0.00002)
Population less than 25	0.0002	(0.0002)	0.0004	(0.001)
Unemployment Rate	0.002***	(0.0002)	0.001***	(0.0004)
Average education	-0.003***	(0.001)	-0.001	(0.001)
Women in parliament	-0.0001	(0.0001)	-0.0002	(0.0003)
Government Share	0.001***	(0.0005)	0.001***	(0.0002)
Year95	-0.002	(0.001)	-0.002	(0.001)
Year96	-0.007***	(0.001)	-0.007**	(0.001)
Number of Observations	54,209		54,209	
Log-Likelihood	-6532.006		-6315.237	

The Coefficients are the marginal effects. Standard errors are in parentheses. They are adjusted for clustering ate the country level. * signifies statistical significance at the 10% level; ** ate the 5 percent level, and *** at the 1% percent level or less.

Table 4A
The Determinants of Corruption Perception Index
Dependent Variable: Transparency International Corruption Measure
Instrumental Variables Estimation

		Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)
		I	II	III	IV	V
A	Average Corruption	0.177** (0.056)	0.73* (0.311)	0.09 (0.315)	-0.038 (0.182)	---
	(Average Corruption)^2	---	-0.023 (0.016)	-0.004 (0.011)	---	---
	Low Expropriation Risk	---	---	-1.709 (1.157)	-1.947 (1.172)	-1.775** (0.603)
	F p-value	---	8.95 (0.016)	0.09 (0.918)	---	---
	Mean (std.) of Average Corruption	6.771 (9.090)	6.771 (9.090)	6.771 (9.090)	6.771 (9.090)	6.771 (9.090)
B	Government Corruption	0.019** (0.007)	0.289** (0.08)	0.173 (0.203)	0.001 (0.048)	---
	(Government Corruption)^2	---	-0.003*** (0.001)	-0.002 (0.002)	---	---
	Low Expropriation Risk	---	---	-1.136 (1.116)	-1.77** (0.574)	-1.775** (0.603)
	F p-value	---	(6.96) 0.0273	0.40 (0.684)	---	---
	Mean (std.) of Government Corruption	30.076 (26.685)	30.076 (26.685)	30.076 (26.685)	30.076 (26.685)	30.076 (26.685)
C	Police Corruption	0.09 (0.05)	0.296** (0.106)	0.078 (0.337)	-0.062 (0.13)	---
	(Police Corruption)^2	---	-0.005 (0.006)	-0.003 (0.008)	---	---
	Low Expropriation Risk	---	---	-1.923 (2.308)	-2.282 (1.402)	-1.775** (0.603)
	F p-value	---	4.39 (0.067)	0.06 (0.946)	---	---
	Mean (std.) of Police Corruption	31.730 (21.669)	31.730 (21.669)	31.730 (21.669)	31.730 (21.669)	31.730 (21.669)

Table 4A (concluded)

D	Custom Corruption	-0.032**	0.549	0.255	0.046	---
		(0.011)	(0.487)	(0.387)	(0.078)	
	(Custom Corruption)^2	---	-0.016	-0.006	---	---
			(0.014)	(0.011)		
	Low Expropriation Risk	---	---	-1.72**	-2.317**	-1.775**
				(0.607)	(0.799)	(0.603)
	F	---	0.65	0.29	---	---
	p-value		(0.557)	(0.756)		
	Mean (std.) of Custom Corruption	12.938 (14.310)	12.938 (14.310)	12.938 (14.310)	12.938 (14.310)	12.938 (14.310)
E	Inspector Corruption	-0.106*	-0.035	-0.073	-0.07	---
		(0.045)	(0.064)	(0.112)	(0.09)	
	(Inspector Corruption)^2	---	-0.002	0	---	---
			(0.003)	(0.005)		
	Low Expropriation Risk	---	---	-1.686	-1.678**	-1.775**
				(0.94)	(0.644)	(0.603)
	F	---	2.20	0.48	---	---
	p-value		(0.192)	(0.640)		
	Mean (std.) of Inspector Corruption	8.444 (11.384)	8.444 (11.384)	8.444 (11.384)	8.444 (11.384)	8.444 (11.384)
F	Other Corruption	0.001	0.182	0.095	-0.022	---
		(0.026)	(0.134)	(0.143)	(0.061)	
	(Other Corruption) ^{2}	---	-0.006	-0.004	---	---
			(0.006)	(0.006)		
	Low Expropriation Risk	---	---	-1.474**	-1.805**	-1.775**
				(0.431)	(0.64)	(0.603)
	F	---	1.14	0.23	---	---
	p-value		(0.381)	(0.802)		
	Mean (std.) of Other Corruption	16.813 (16.202)	16.813 (16.202)	16.813 (16.202)	16.813 (16.202)	16.813 (16.202)
	N	43	43	43	43	43

Linear and quadratic Corruption and Low Expropriation Risk are endogenous. Regressions also include region and legal origin dummies and religion variables.
Standard errors are in parentheses. They are adjusted for clustering at the region level. * signifies statistical significance at the 10% level; ** at the 5 percent level, and *** at the 1% percent level or less.

Table 4B
The Determinants of Corruption Perception Index
Dependent Variable: World Bank Corruption Measure
Instrumental Variables Estimation

		Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)
		I	II	III	IV	V
A	Average Corruption	0.095* (0.04)	0.246** (0.088)	0.097 (0.148)	0.049 (0.035)	---
	(Average Corruption)^2	---	-0.006 (0.004)	-0.002 (0.004)	---	---
	Low Expropriation Risk	---	---	-0.339 (0.295)	-0.427 (0.269)	-0.647** (0.253)
	F p-value	---	5.32 (0.047)	1.39 (0.320)	---	---
	Mean (std.) of Average Corruption	6.710 (8.993)	6.710 (8.993)	6.771 (9.090)	6.771 (9.090)	6.771 (9.090)
B	Government Corruption	0.002 (0.017)	0.096*** (0.026)	0.036 (0.055)	-0.011 (0.012)	---
	(Government Corruption)^2	---	-0.001*** (0.00)	-0.001 (0.001)	---	---
	Low Expropriation Risk	---	---	-0.512 (0.272)	-0.687** (0.241)	-0.647** (0.253)
	F p-value	---	31.64 (0.001)	2.43 (0.169)	---	---
	Mean (std.) of Government Corruption	30.037 26.374	30.037 26.374	30.076 (26.685)	30.076 (26.685)	30.076 (26.685)
C	Police Corruption	0.033 (0.027)	0.125 (0.072)	0.077 (0.137)	-0.012 (0.026)	---
	(Police Corruption)^2	---	-0.002 (0.004)	-0.002 (0.002)	---	---
	Low Expropriation Risk	---	---	-0.516 (1.446)	-0.747 (0.396)	-0.647** (0.253)
	F p-value	---	2.46 (0.166)	0.48 (0.643)	---	---
	Mean (std.) of Average Corruption	31.284 (21.619)	31.284 (21.619)	31.730 (21.669)	31.730 (21.669)	31.730 (21.669)

Table 4B (concluded)

D	Customs Corruption	-0.012	0.278	-0.023	0.025	---
		(0.013)	(0.203)	(0.138)	(0.022)	
	(Customs Corruption)^2	---	-0.009	0.001	---	---
			(0.006)	(0.004)		
	Low Expropriation Risk	---	---	-1.079	-0.942**	-0.647**
				(0.747)	(0.321)	(0.253)
	F	---	1.09	0.40	---	---
	p-value		(0.395)	(0.685)		
	Mean (std.) of Custom Corruption	13.718 (15.059)	13.718 (15.059)	12.938 (14.309)	12.938 (14.309)	12.938 (14.309)
E	Inspector Corruption	-0.045	-0.002	-0.021	-0.044	---
		(0.025)	(0.02)	(0.037)	(0.033)	
	(Inspector Corruption)^2	---	-0.001	-0.001	---	---
			(0.001)	(0.002)		
	Low Expropriation Risk	---	---	-0.528	-0.586**	-0.647**
				(0.307)	(0.233)	(0.253)
	F	---	1.73	1.35	---	---
	p-value		(0.254)	(0.329)		
	Mean (std.) of Inspector Corruption	8.410 11.253	8.410 11.253	8.444 11.384	8.444 11.384	8.444 11.384
F	Other Corruption	0.01	0.081	0.065	0.019	---
		(0.025)	(0.043)	(0.041)	(0.029)	
	(Other Corruption) ^{2}	---	-0.002	-0.002	---	---
			(0.002)	(0.001)		
	Low Expropriation Risk	---	---	-0.491*	-0.621**	-0.647**
				(0.212)	(0.243)	(0.253)
	F	---	1.86	1.27	---	---
	p-value		(0.235)	(0.348)		
	Mean (std.) of Other Corruption	16.551 (16.107)	16.551 (16.107)	16.813 (16.202)	16.813 (16.202)	16.813 (16.202)
	N	44	44	43	43	43

Linear and quadratic Corruption and Low Expropriation Risk are endogenous. Regressions also include region and legal origin dummies and religion variables.
Standard errors are in parentheses. They are adjusted for clustering at the region level. * signifies statistical significance at the 10% level; ** at the 5 percent level, and *** at the 1% percent level or less.

Table 5
Determinants of Growth
Dependent Variable: Average Annual Growth 1975-1995
Instrumental Variables Estimation

	I	II	III	IV	V
Corruption	-0.007	-0.006	-0.002	---	-0.001
	(0.014)	(0.005)	(0.002)		(0.002)
Corruption^2	0.0002	0.0001	---	---	---
	(0.0004)	(0.0002)			
Low Expropriation Risk	-0.001	---	---	0.01**	0.007
	(0.02)			(0.004)	(0.004)
Western Europe	-0.003	-0.005	-0.004	-0.02	-0.013*
	(0.018)	(0.01)	(0.004)	(0.012)	(0.005)
Central Europe	-0.001	-0.006	-0.018	-0.044	-0.034
	(0.069)	(0.02)	(0.013)	(0.025)	(0.021)
Africa	-0.023	-0.021	-0.011	-0.01	-0.007
	(0.062)	(0.032)	(0.013)	(0.02)	(0.016)
Latin America	0.028	0.023	0.014	-0.027	-0.004
	(0.049)	(0.027)	(0.033)	(0.023)	(0.027)
Asia	-0.021	-0.022	-0.02*	-0.028	-0.024
	(0.018)	(0.02)	(0.01)	(0.021)	(0.014)
Mediterranean	-0.009	-0.011	-0.005	-0.029	-0.018
	(0.014)	(0.016)	(0.017)	(0.028)	(0.018)
British Legal Origin	-0.004	-0.006	-0.014	-0.021	-0.02
	(0.048)	(0.026)	(0.023)	(0.022)	(0.025)
French Legal Origin	-0.007	-0.008	-0.01	-0.009	-0.013
	(0.047)	(0.04)	(0.035)	(0.018)	(0.03)
German Legal Origin	-0.005	-0.006	-0.008	-0.007	-0.01
	(0.044)	(0.038)	(0.039)	(0.026)	(0.036)
Percent Muslim	0.001	0.001	0.002	(0.0004)	0.001
	(0.002)	(0.002)	(0.001)	(0.0003)	(0.001)
Percent Catholic	-0.0003	-0.0002	-0.0003	-0.0001	-0.0001
	(0.0004)	(0.0002)	(-0.0002)	(0.0002)	(0.0002)
Percent Protestant	-0.0002	-0.0002	-0.0003	-0.0002	-0.0003
	(0.0005)	(0.0004)	(0.0003)	(0.0002)	(-0.0003)
War	0.006	0.005	-0.003	-0.002	0.0001
	(0.02)	(0.013)	(0.009)	(0.009)	(0.008)
Initial GDP	0.012	0.01	0.011	-0.001	0.004
	(0.008)	(0.011)	(0.008)	(0.003)	(0.008)
Federal	-0.002	-0.002	-0.001	-0.003**	-0.002*
	(-0.002)	(0.002)	(0.002)	-0.0007	(0.001)
Average Education in 1975	-0.004	-0.004	-0.002	-0.001	-0.001
	(0.009)	(0.003)	(0.004)	(0.003)	(0.004)
Constant	0.117	0.103**	0.079	-0.003	0.023
	(0.226)	(0.029)	(0.044)	(0.043)	(0.075)
No. of observations	30	30	30	30	30

Linear and quadratic corruption variables and expropriation risk are endogenous. Standard errors are adjusted for clustering at the region level. The mean value of Initial GDP (per capital income in 1975) in the sample of 30 countries is 9.23 (in $1,000s). The mean value of Average Education in 1975 is 5.73.

Table 6
Determinants of Growth
Dependent Variable: Average Annual Growth 1975-1995
Instrumental Variables Estimation

	(I)	(II)	(III)	(IV)
Corruption	0.0001	-0.00003	-0.0003	-0.001
	(0.001)	(0.0005)	(0.001)	(0.001)
Low Expropriation Risk	0.010**	0.007***	0.007**	0.011**
	(0.003)	(0.002)	(0.002)	(0.003)
Western Europe	---	---	---	-0.007
				(0.005)
Central Europe	---	---	---	-0.014
				(0.011)
Africa	---	---	---	-0.001
				(0.018)
Latin America	---	---	---	-0.0004
				(0.013)
Asia	---	---	---	-0.011
				(0.015)
Mediterranean	---	---	---	-0.013
				(0.014)
British Legal Origin	0.007	---	---	---
	(0.007)			
French Legal Origin	0.003	---	---	---
	(0.008)			
German Legal Origin	0.006	---	---	---
	(0.008)			
Percent Muslim	0.0005	0.001**	0.001*	0.001
	(0.0003)	(0.0002)	(0.0003)	(0.001)
Percent Catholic	-0.00001	-0.0001	-0.00003	-0.00002
	(0.0001)	(0.0001)	0.0001	0.0001
Percent Protestant	0.00002	-0.00004	-0.00004	-0.0001
	(0.00004)	(0.00004)	(0.0001)	0.0002
War	-0.004	-0.007	---	0.001
	(0.013)	(0.013)		(0.007)
Federal	-0.002***	-0.002*	-0.001	-0.002**
	(0.0005)	(0.001)	(0.001)	(0.001)
Initial GDP	-0.0005	0.003	---	-0.0005
	(0.006)	(0.005)		(0.006)
Average Education in 1975	-0.0003	-0.001	-0.001	-0.0004
	(0.001)	(0.001)	(0.001)	(0.002)
Constant	-0.047	-0.019	-0.023	-0.036
	(0.026)	(0.013)	(0.017)	(0.045)
No. of observations	30	30	30	30

Linear and quadratic corruption variables and expropriation risk are endogenous. Standard errors are adjusted for clustering at the region level. The mean value of Initial GDP (per capital income in 1975) in the sample of 30 countries is 9.23 (in $1,000s). The mean value of Average Education in 1975 is 5.73.

Table 7
Determinants of Growth
Dependent Variable: Average Annual Growth 1975-1995
Instrumental Variables Estimation

	Excluding Developed Countries			Excluding Developed and Mediterranean Countries		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Corruption	-0.0004	-0.001	-0.0002	-0.0003	-0.0003	-0.0003
	(0.0004)	(0.001)	(0.001)	(0.0003)	(0.001)	(0.001)
Expropriation Risk	0.009**	0.009**	0.009*	0.008	0.011**	0.011**
	(0.002)	(0.003)	(0.004)	(0.005)	(0.003)	(0.003)
Percent Muslim	0.0004*	0.001	---	0.0005	0.0004	---
	(0.0002)	(0.0004)		(0.0003)	(0.0004)	
Percent Catholic	-0.0001	-0.0005	---	-0.0001	-0.00002	---
	(0.0001)	(0.0001)		(0.0001)	(0.0002)	
Percent Protestant	-0.0004	-0.0004	---	-0.0004	-0.0003	---
	(0.0002)	(0.0003)		(0.0002)	(0.0003)	
War	0.001	---	---	-0.002	---	---
	(0.009)			(0.009)		
Federal	-0.004	---	---	-0.004	---	---
	(0.011)			(0.013)		
Initial GDP	-0.002	-0.003**	-0.003**	-0.001	-0.002	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Average Education in 1975	-0.002	-0.002	-0.002***	-0.003	-0.003	-0.003**
	(0.001)	(0.001)	(0.0004)	(0.002)	(0.002)	(0.001)
Constant	-0.02	-0.017	-0.028	-0.011	-0.037**	-0.033
	(0.019)	(0.036)	(0.033)	(0.028)	(0.009)	(0.035)
No. of observations	19	19	19	16	16	16

Linear and quadratic corruption variables and expropriation risk are endogenous. Standard errors are adjusted for clustering at the region level. The mean value of Initial GDP (per capital income in 1975) in the sample of 19 countries is 5.47 (in $1,000s). The mean value of Average Education in 1975 is 4.15. The mean value of Initial GDP in the sample of 16 countries is 4.45 , and the mean of Average Education in 1975 is 4.14.

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